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## ADDRESSES.

### ADDRESS ON GENERAL MEDICINE.

#### THE MALARIAL DISORDERS OF LARGE CITIES, WITH ESPECIAL REFERENCE TO CHICAGO.

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It is a fact of familiar observation and comment that irregular cases of malarial disorder are occasionally met with at all seasons of the year and in all localities. It is equally well known that the conditions existing in large cities are inimical to the production of the malarial poison. The busiest metropolitan physician sees very few examples of frank periodical malarial fever that unquestionably originated in paved and sewered portions of his city. The rare cases that do occur are accounted for upon the assumption of "limited foci" of infection. If an excavation for building purposes is found in the neighborhood, no matter what the season of the year, it is readily assumed that the upturning of the soil is the cause of the patient's sickness. Or, if the individual has been out of the city, at any time within a period of a year or two, it is taken for granted with equal promptitude and with equal lack of knowledge of the truth, that he received the infection at that time, and that it has been sleeping or "latent" in his body ever since; and if he actually visited a region known to be malarious, even though it were several years before, the discovery of the fact is regarded as having almost the force of a demonstration of the exact time and place of intoxication. And, if no recent excavation can be discovered and no absence from the city has occurred, it is nevertheless unyieldingly maintained that some subtle emanation from the soil, somewhere, must be held responsible for the result.

In considering this problem it is well to include the questions of season, climate and locality. Contemplate the climate of Chicago between November and March when the earth is frozen to a depth of a foot or more, a good part of the time, and also covered with frozen snow—to say nothing of macadamized pavement; when the temperature has been below zero for a month and below the freezing point for several months; when building operations have been arrested and a recent excavation can not be found anywhere; and then try to account for the malarial affections that prevail on the finest avenues and boulevards of that city during and between the months named, by assuming that there has been some subtle morbid emanation from the soil!

The country surrounding the head of Lake Michigan was intensely miasmatic before it became densely populated and comparatively well drained; and the environs of Chicago are miasmatic still. Modern treatises say that the presence of malarial disorders in the region of the Great Lakes is not extensive, but is limited mainly to the vicinity of Lake St. Clair and the southern shore of Lake Erie. I have believed and maintained for many years that there were no such disorders in Chicago, that originated in finished portions of the city, except here and there a chance case from fresh upturnings of the soil. I used to think that malarial infection was easily recognizable, except in rare instances, on the basis of a strong individuality of its symptomatology; but now I think cases are common in which no man that lives or ever has lived can make a reliable diagnosis on a basis of their external phenomena. I also think that I have been seeing such cases all my life and labeling them "irregular typhoid fever" and "rheumatism" and "grippe" and "purpura hemorrhagica," or something else. I used to refer to the word "malaria" as the refuge of ignorance—and it was, and is, and will continue to be used by doctors when they do not know what is the matter with their patients. But when the diagnosis is supported by a microscopic demonstration it is different. We can ridicule an opinion but we must make obeisance to a fact. In this day, diagnosis is not always a mere matter of judgment. It may be a matter of demonstration. For purposes of medical literature and debate there are no cases of malarial disease in large cities and other localities regarded as non-malarious except such as have been proved by microscopic examination of the blood. And yet just such cases are common in Chicago; and if they are common in Chicago, it would be surprising if they did not occur at all in Milwaukee and Detroit and Cleveland and Buffalo.

It is interesting to recall the fact set forth in "Parkes' Treatise on Hygiene" that the inhabitants of the highly malarious plains of Troy, and of the extensive and pestilential marshy regions of India, are unanimous in testifying that those who drink marshy water are liable to have fevers at all times of the year, and that those who studiously avoid the use of such water are affected, if at all, only during the late summer and autumn months. It is also serviceable to remember that places inherently healthful are dangerous to life by reason of their connection with the breeding places of malaria through rivers which constitute the sources of water supply for their inhabitants. Aitken points out that the Upper Godavery Tract, one of the most virulently malarious regions of India, does not contain one acre of marshy ground; but its people drink the water of the Godavery River which drains more dense forest land than any river in the Empire. Similar illustrations might

be gathered from various parts of our own country. Professor Bemiss, of New Orleans, shows that the poison of malaria may live in water an indefinite and undetermined time, and be conveyed by currents through immense distances, even to remote islands and continents.

If these statements are true, we are warranted in using the facts upon which they are based in elucidating the causes of the prevalence of palustral diseases in Chicago and, possibly, in the other lake cities named. Many a marshy stream empties its waters into those of Lake Michigan. The prevailing current of the lake is northward toward the Straits of Mackinaw. The Calumet River which drains an extensive marshy area in the northwestern part of Indiana and the adjoining portion of Illinois empties its accumulations of organic matter into the lake three or four miles south of the "crib" or opening of the great tunnel which supplies the south division of the city with water. The Chicago River also drains a marshy region and its polluted waters passing into the lake and directed northward, away from the tunnel opening just alluded to, are more likely to affect the sources of supply of other portions of the city. Contrary winds, doubtless, disturb the ordinary direction of diffusion of the marsh poisons through the lake. It is not to be inferred that the water used by the citizens of Chicago is inferior to that of other large cities, for there is abundant evidence that it is not; but it can not be denied that it contains the products of the marshy regions surrounding the head of Lake Michigan. Nor is it to be assumed that every drop, nor even every ton of this water is thus contaminated. It will be sufficient to admit that here and there a citizen gets a dose of the morbid poison in his drink. This is a more rational and satisfying explanation of the midwinter origination of malarial disorders in Chicago and, possibly in other lake cities, than any supposition in favor of "limited foci" of infection which requires us to believe that frozen ground covered with frozen snow can belch forth miasm into an atmosphere whose temperature is below zero, and stock that atmosphere with living malarial organisms.

In the light of these facts, I respectfully invite attention to the following clinical records which represent, in the main, the observations of Dr. Frank Seward Johnson, Dr. Frank Billings and the writer, covering a period of several months.

*Case 1.*—A man, aged 38 years, whose health has been undisturbed for the past fifteen or eighteen years, excepting that now and then he has had vague flitting rheumatoid pains that were strikingly influenced by changes in the weather. He began to be sick in April, 1894. His sickness developed into a typical spleno-myelogenic leukemia. The first blood studies were made for me by Dr. W. A. Evans, Professor of Pathology in the College of Physicians and Surgeons, Dec. 15, 1894, and during the same month the case was used as the subject of a clinical lecture. The case is described in detail in the *Chicago Clinical Review* for January, 1895,—the description including a differential count of the blood corpuscles. The blood contained no malarial organisms. Slides preserved. Again, March 11, 1895, Dr. Evans examined the blood to ascertain the effects of the free administration of Fowler's solution and the glycerite of bone marrow. The number of red corpuscles had increased 17 per cent. and the hemoglobin gain was 8 per cent. The number of leucocytes had increased to a still greater extent. In December the ratio was 1 white to 65 red, and in March it was 1 to 55. The blood contained no protozoa. Slides preserved.

The latter part of March, 1895, the patient was admitted to the Michael Reese Hospital, and his blood was examined

for malarial organisms by Dr. Sievers of that institution. None were found. April 1 a change in attending physicians occurred and the patient passed to the care of Dr. F. S. Johnson, Professor of Pathology in the Chicago Medical College. A few days later Dr. Johnson found the blood teeming with plasmodia,—intra-corpuscular pigmented and unpigmented bodies, and free flagellated forms. There is no question as to the correctness of the original diagnosis. The case is not one of malarial cachexia with ague cake. It is one of leukemia; and the patient became infected with "malaria" after his admission to the hospital. This institution is one of the best constructed and best managed of the kind in Chicago. It is located on clean sandy soil near the lake shore and there are no recent excavations to be found near it.

*Case 2.*—Mrs. L., aged 56 years. Residence Bowen Avenue. Has lived in Chicago eighteen years. She has been an invalid eight years on account of arthritis deformans; and for the past two years has not been off the bedroom floor of her residence. Of late there has not been much suffering but there is almost universal destruction of the joints. There are also extensive cardio-vascular changes. The urine is habitually scanty, the bowels costive, appetite, digestion and general nutrition, fair. January, 1895, was called to see the lady and found her strikingly feeble, anemic, with edematous feet and ankles, and complaining of distress in her stomach. Prescribed without making a systematic examination.

March 24 visited her without being sent for. A couple of days before I had a conversation with a medical friend on the subject of masked malarial intoxication and had become curious after more complete knowledge of my patient's condition. Found her under the care of another physician and treated for "grippe." She was very ill. The attendant consented to have the lady's blood examined. I was informed by the gentleman who made the examination that the blood contained many intra-corpuscular bodies, pigmented and unpigmented, and a few organisms that were free. Nevertheless the patient died of "grippe" a few days later.

*Case 3.*—L. B., aged 6 years. Residence Prairie Avenue near 50th Street. The child was born in Chicago, has never been out of the city, and has been out of the house only two or three times since Christmas, 1894. General health good. Domicile and surroundings wholesome. March 18 the patient developed a fairly typical quotidian intermittent fever. Malarial infection proved. No excavation of recent date found.

*Case 4.*—Miss H., aged 16 (?) has lived in Chicago many years in a good house and neighborhood. No excavations near. April, 1894, she began to be sick gradually with a continued type of fever marked by irregular fluctuations, which was labeled by the attending physician, Dr. Samuel Cole, "typhoid fever with malarial features." The fever continued about four weeks and then, after an interval of normal temperature lasting a few days, there was a relapse. The patient had taken quinin freely from the beginning. Upon the basis of two examinations made by myself during the month of May, 1894, the diagnosis of the family physician was sustained. Later the blood of the patient was examined by Dr. F. S. Johnson and the fact of malarial infection, previously assumed to exist, was demonstrated. Quinin was administered with great freedom by the mouth, rectum and hypodermatic method, and arsenic and iron were also pressed systematically, but without affecting the course of the disease. The patient was seen at this time by Dr. N. S. Davis. Her illness continued over four months, uninfluenced by treatment to an important extent, and finally came to be attended with acute pulmonary tuberculosis. Death occurred five or six weeks later—the blood of the patient crowded with plasmodia to the last. Her sputa had been examined for bacilli repeatedly during the progress of the sickness, but none were found till "between three and five weeks before death."

*Case 5.*—Young lady just arrived in Chicago direct from her home in New York City. Before leaving home she had an alveolar abscess which had been thoroughly drained and which was discharging freely when she arrived in Chicago. She had a chill on the train, and some hours later when examined by Dr. Cole showed a temperature of 103.5 degrees. The abscess cavity was thoroughly and frequently irrigated with antiseptic solutions. Drainage perfect. A second chill occurred that night and the ensuing fever reached 105 degrees. The next morning patient's temperature was normal. Thorough search for pent up pus was made by the consultant, Dr. L. L. McArthur, and none was found. Dr. Cole then examined the patient's blood and found it

stocked with malarial organisms. Quinin, administered freely by the stomach, had the effect of modifying the recurrent paroxysms of fever and of lessening the number of protozoa in the blood. A violent gastro-intestinal catarrh occurred at this time which made it necessary to give the antiperiodic hypodermatically. This was done; but, notwithstanding the administration of 40 to 60 grains daily and the fact that the patient was kept profoundly cinchonized, the chills and fever increased in frequency and severity. Some abscesses occurred in the site of subcutaneous injections. Malarial infection of the blood continued till the death of the patient. It seems to have originated in New York City.

(Cases 6 to 8 inclusive, occurred in the practice of Prof. Frank Billings.)

*Case 6.*—M. W., a boy aged 10 years. Residence Drexel Boulevard. Family history good. The boy has never been seriously sick. At home he uses Waukesha water but at school he drinks hydrant water. About Dec. 1, 1894, the boy, seeming to be quite well, had two primary incisor teeth extracted. Continuous hemorrhage resulted which was checked with difficulty. December 5, epistaxis began which finally required plugging of the anterior and posterior nares for its arrest. Between December 4 and 14, numerous points of subcutaneous hemorrhage appeared, together with a subconjunctival extravasation. The child was now exsanguinated, weak, restless, of normal temperature, and exhibited a pulse rate of 120. Spleen not palpable. Liver area normal. December 14 the blood was found to contain both intra-corporal and free, malarial organisms. Quinin and Fowler's solution were prescribed and the patient improved steadily. December 16 the spleen was found to be palpably enlarged and there was a slight rise in temperature. Small nasal hemorrhages occurred on two or three later occasions but the boy was fully restored within a month. The patient was seen in consultation with the family physician, Dr. E. O. F. Roler. The case simulated purpura hemorrhagica and it appears certain that the information furnished by the blood examination resulted in the saving of life.

*Case 7.*—J. O. B., a laborer, aged 49, has lived in Chicago fifteen years and has not been out of the city any important length during this period. Admitted to Mercy Hospital Sept. 30, 1894. Has had irregular bowels all his life, and more or less dyspepsia the last five years. Eight years ago he had severe attacks of biliary colic and four years ago he broke his right leg near the ankle. Some deformity has resulted, the skin covering which is red and scaly. About six months ago he noticed bluish-black discolorations between the knee and ankle, which, subsequently, became yellow and itchy. Still later, similar spots appeared on the thighs, and extended until they discolored the whole integument of the lower extremities. Where he had scratched the skin it had become inflamed, and a sticky discharge issued from it. On admission his liver and spleen were found to be somewhat enlarged; his urine was normal; and the lymphatics of the groins, axillæ and neck were increased in size. His morning temperature ranged from 98 to 99.4 degrees and his evening temperature between 100 to 102.2 degrees. Originally the case was regarded and treated as one of eczema. December 2 a blood examination was made and large numbers of malarial organisms were found, free and intra-corporal. Quinin and arsenic were prescribed, together with an occasional purgative; and the patient improved rapidly. He left the hospital, convalescent, Jan. 8, 1895. At that time his spleen was still palpable but much diminished in size. The purpuric eczema was well. On his way home he became chilled and the next day was seized with severe colicky diarrhea which continued till he returned to the hospital, completely exhausted, January 21. At this time the blood examination was negative as to malarial organisms. The patient died three days later. The autopsy, confined to the abdomen, revealed ulcerative enteritis, a chronic splenic tumor and sclerosis of the liver.

*Case 8.*—Mrs. F. S. S., aged 36, formerly lived in the southern part of Indiana and suffered from malarial fevers, but for two years past has lived in Minneapolis, Minn., and has had good health. She still visits her old home occasionally. During the latter part of October, 1894, she was suddenly seized with severe pain in the epigastrium which radiated toward the right hypochondrium and was especially severe in the region of the gall bladder. The pain was attended with nausea and vomiting and was so intense that it required large doses of morphin, hypodermatically, to subdue it. It recurred daily but at irregular hours, for two weeks. It suddenly shifted to the region of the right kidney but contin-

ued with unabated violence at irregular times till about the middle of December. The first diagnosis was biliary colic and the second renal colic. An exploratory operation was under consideration. The urine was scanty and the twenty-four hours' urea was about half the normal quantity; but no abnormal ingredients were present. A blood examination made Jan. 4, 1895, discovered a considerable number of intra-corporal malarial parasites. The free use of quinin was attended with immediate improvement and at the end of six weeks the patient returned home entirely recovered. Much of the time consumed in the treatment was required to overcome the effects of the long continued and free use of morphin. Here a correct diagnosis saved the patient from a severe operation.

(Cases 9 to 13, inclusive, occurred in the practice of Dr. F. S. Johnson.)

*Case 9.*—Mrs. F. was seen a week after normal confinement. She had much headache, a little fever and an irregular lochial discharge which was profuse and bloody every afternoon. Pulse 90 to 100 and temperature 99 to 100 degrees. Blood contained many endoglobular and a few free bodies. Under the usual treatment symptoms promptly ceased.

*Case 10.*—March, 1895. Mrs. C., aged 55, has lived in Chicago forty years and in her present home fifteen years; and has not been out of the city in three years. There are no excavations in the neighborhood. The patient was perfectly well till early in January. At that time, upon awakening one morning, she found her feet red, swollen and painful and her left arm and leg numb and weak. The paresthesiæ have continued but have been inconstant as to intensity and location—absent at times and now limited to one side and then to the other. The redness and swelling of the feet disappeared in twenty-four hours to be followed by a crop of raised, infiltrated, tender erythematous spots, varying in size from that of a silver quarter dollar to that of a five cent piece, which lasted several days and left blood stains. Successive crops have appeared at irregular intervals, and the individual spots show all stages of development and decline. Five days after the onset of the sickness the patient developed a tertian intermittent fever; but this has not seemed to make any impression on the rheumatoid phenomena or the erythematous nodes. Spleen enlarged; bowels torpid; tongue coated; skin anemic and sallow. Examination of the blood discovered small endoglobular bodies and large amœboid endoglobular bodies containing pigmented particles in active motion. Under anti-malarial treatment the rheumatoid pains disappeared; the erythematous nodes continued but were lessened in number; but the chills and fever were not benefited. At the end of three weeks of such experience the patient decided to "quit doctoring." A noteworthy feature of the case is the varying persistence of its different features.

*Case 11.*—February, 1895. Mrs. M., aged 27, was chilled by the weather the night she left New York City, and on arriving in Chicago she had high fever, severe headache and general pains. All symptoms except the headache disappeared in two days under the use of salicylate of sodium and a laxative; but the headache persisted. The blood contained many plasmodia. Quinin, grs. x, was administered, and the headache ceased within twenty-four hours. Two days later the patient called attention to a circumscribed edematous redness on the front surface of both ankles and over the left inner malleolus. Treatment continued, and in a day or two the lady was well enough to resume travel. Infection seems to have occurred in New York City.

*Case 12.*—January, 1895. Mrs. M., aged 55, has not been out of the city for many years. General health good. Last two weeks has had headache, backache, post-sternal pain and a little cough, and has been getting pale and weak. Each morning at about 11 o'clock she has slight chilly sensations followed by about two hours of fever and this by sweating. Diagnosis based on blood examination. Anti-malarial treatment was slowly successful.

*Case 13.*—May 2, 1895. Infant born about Nov. 1, 1894. Suckled by a hired nurse. Thrived till it was three months old. Since that time it has been having an irregular diarrhea and has gained none in weight. No fever. On careful inquiry it was learned that the nurse had been ailing a little. An examination of her blood showed malarial infection. Examination of the infant's blood revealed numerous large and a few small endoglobular bodies. The intestinal disturbance abated instantly upon substituting sterilized cow's milk for the nurse's milk, and the blood infection disappeared promptly under the usual treatment.

The foregoing cases have been selected from a total of forty-five which, with very few exceptions, have occurred since November, 1894. Without the coöperation of the gentlemen named I would not had sufficient cases for this communication. The interesting cases occurred in their practice. Those cited have been selected because they present certain striking facts bearing upon the questions of the source of infection, the diagnosis, and the limitations of the curative powers of our best anti-malarial medicines. Of the total number, thirty unquestionably originated in Chicago between December and May and, leaving out two or three, they originated in a choice and densely populated portion of the south division. It is impossible to say how many cases have been overlooked. Blood examination was confined to suspicious or confusing ailments. Similar cases are, doubtless, quite as common in other parts of the city; but I know of no observations which establish the fact. The exact source of infection is a matter of conjecture. There may be those who can conceive of protozoa disporting themselves on the lake shore of Chicago in December or January without a stitch of clothes on, in an atmosphere that is 10 degrees below zero; but it is easier to believe that the malarial organisms, like other protozoa, live in the water and obtain entrance to the human body by being swallowed. This is not intended as a denial of the possibility, nor even of the likelihood, that marsh air may be laden with them, especially the night and early morning air containing an abundance of moisture. Indeed, if it be true, as stated by H. Gilman Thompson, that they have actually been discovered in the air, there is no ground for further controversy. But so far as known every vital phenomenon manifested by these parasites requires the presence of water; and Bartley, of Brooklyn, N. Y., has demonstrated that they exist in the common source of water supply of that city—a fact that is likely to direct investigation into like channels in relation to other cities. The proofs of water infection are quite as strong as those of air infection, and there is not a doubt that impure water is responsible for the occurrence of paludal disease with immensely greater frequency than is generally known. We have been beguiled by the belief that such diseases do not originate in large cities and especially in the dead of winter; but there is good reason to suspect that they are a more common cause of death in these places than has been supposed, and that the "masked" or atypical forms which are very common are rarely identified. As to their rate of prevalence, beyond the primary fact that physicians of active practice meet with one or two cases per week in Chicago we have no knowledge, but we are free to assume that the malarial organism has no better life prospects in the middle of a severe winter than it has at other seasons of the year, and is no more likely to get into the human body. Most of the cases met have been of the "masked" variety, and, from the standpoint of external phenomena, have not been recognizable as examples of malarial infection. Some have been easily identified on the basis of the periodicity of their symptoms—neuralgic or febrile. Cases strongly simulating pernicious anemia, rheumatism, grippe, erythema nodosum, pyemia, puerperal infection, purpura hemorrhagica, biliary and renal colic, chronic eczema and digestive derangements, are herein recorded, in which it would seem impossible to reach

a correct conclusion without a careful examination of the blood. In a few of the cases it appears probable that the demonstrated malarial infection was an incident and not the cause of the various morbid phenomena described.

Examples of a mild grade of temporary infection in which the health of the individual is but little disturbed are very common. In eight cases pulmonary tuberculosis and malarial toxemia co-existed—an impressive fact suggesting the idea that the diminished powers of resistance occasioned by one, predisposes to the other. In less than half the number a history of periodicity was elicited, but in most of these it required close questioning and observation to do so. The absence or presence of this feature is not safe ground for differential diagnosis. Distinction must be made between true periodicity and the erratic appearance and disappearance of symptoms or of fluctuations in their severity. The entire absence of fever—a characteristic of many cases—would be enough to obviate suspicion on the part of city doctors, especially in the winter season of northern latitudes, that the case in hand may be one of paludal intoxication. Nor is the therapeutic test a reliable guide to diagnosis. The failure of quinin to arrest febrile or other symptoms of disease is considered by many a demonstration that such disease is non-malarial. This assumption is not correct. A patient whose blood is teeming with hematozoa may be profoundly cinchonized for weeks and then die with an undiminished number of parasites in his circulation. In other cases, as every one knows, the medicine is instantly efficacious. These observations strongly support the conclusions of Golgi, Baccelli and others that under the one name are included separate and distinct varieties of microorganism. Quinin causes some symptoms to disappear while others persist; and those showing periodicity may be the ones to persist. Moreover, blood infection may continue after objective phenomena have ceased, but this is not usual. It is quite plain therefore that malarial disorders are of common occurrence in which it is impossible to say with any certainty of correctness, either upon the basis of the external phenomena or upon that of the action of quinin, whether or not the case in hand is of malarial origin and nature.

The active prevalence of such disorders in a city not known as a breeding place of their specific cause, and the facility with which they may be confounded with other kinds of disease, warrant the suspicion that in all large cities not more favorably situated, thousands of cases occur every year and escape recognition. In this connection some pointed questions can be asked as to the soundness of the prevailing opinions concerning the incubative period of these disorders. The duration of this period as stated by authoritative writers is extremely indefinite. It varies between a few minutes and several years. If the meaning of the term is limited to the time intervening between the reception of the hematozoon and the outbreak of a periodical fever, the indefiniteness of statement referred to is fully warranted; for, inasmuch as no outbreak of fever may occur at all, the patient may die while the germ is still sluggishly incubating. Conceive, if you can, of an infection of the human blood breeding and destroying for months or years before it makes its presence known. Name, if you can, any other infection that behaves in this manner. Yet this is the teaching of the day. Flint says that the incu-

bative period may last as long as four years, and W. H. Daly in a recent essay quotes an unnamed writer as saying that it may last seventeen years! Now is there any proof whatever that any such thing ever happened or is possible? It is said by writers—by Thompson in "An American Text-book of the Theory and Practice of Medicine," for example, that during the incubative period the patient may be in comparative health. Who knows this to be true and how did he learn it? Who has ever known of a case of demonstrated malarial infection lasting thirty days during which time the patient was in undisturbed health? It is not a question of opinion but a question of fact. Who knows?

It is well known that there are great differences between individuals in respect to the quantity of infectious matter required to make them sick. It is also true, as I have witnessed twice within a month, that a child or an adult may show a few malarial organisms in the blood to-day and not one a few days later. And this, without a dose of medicine. At the time of infection there were no evidences of sickness—certainly none so distinctly marked as to be recognizable as elements of a fixed disease. But suppose the parasites had triumphed over the blood corpuscles and feeding upon the hemoglobin, and multiplying, how many years would it take the man to discover that something was wrong? In view of what is known of water infection and suspected in relation to ice, milk and food infection; in view of the activity with which malarial disorders are known to originate in Chicago and reasonably suspected of originating in other large cities, is any one willing to stand before this body and say that malaria can incubate seventeen years, or four years, or three months, without showing any results? Suppose a citizen had visited a malarious region in the South for a few days or weeks a couple of years ago and returned to Chicago in undisturbed health; suppose he continued in perfect health till last December and then came down with a malarial fever; is that proof that he got the infection in the South? By no means. During the same period of time probably thousands of citizens who had not been out of the city at all were similarly taken sick. Yet this is the kind of evidence—utterly and absolutely worthless as it is—upon which the incubative period of malarial disorders is estimated. In the light of the revelations of Laveran we must, till reasonable proof to the contrary is furnished, regard every case of prolonged "latent" infection as an example where the individual did not get infected when he had a good chance, but did get infected in a locality that is not known to be, and yet is, a breeding place of malarial diseases.

The same considerations must be applied to the elucidation of the question of relapses. A person who has had intermittent fever and recovered perfectly may exhibit in the diseases of later life an impress of periodicity without having at the time any malarial infection whatever. In recurrent true malarial fevers it may not be easy to differentiate between relapses and new infections; but we may investigate and eventually be able to answer the question. Suppose a citizen of Chicago had ague, recovered, remained in perfect health a year and then had another attack of ague; is this a relapse? The affirmative would represent prevailing opinion, but is there any proof that prevailing opinion is correct? If the same person had had two attacks of pneumonia

or typhoid fever a year apart, who would designate the second one a "relapse?" Nobody. There is not a vestige of proof, so far as I know, that a person ever had continuous malarial infection a year without being sick in some way. If by the term "relapse," is meant repeated outbreaks of fever during the course of continuous infection—the patient being sick with other derangements caused by the infection every day of the time—the inference is different from that given to it in relation to other kinds of disease. All our literature on the etiology of malarial diseases must be revised and put in accord with existing facts. I offer no apology for discoursing upon a subject with which many of you are vastly more familiar than myself; for familiarity breeds indifference, lack of thoroughness and a thoughtless readiness to take things for granted, and it needs to be made to stop and think now and then. The fact that the germs of malaria are often conveyed into the body by other media than the air and that in a vast but undetermined percentage of cases infection is preventable, is one of the most important and imperious before us today. It makes the duty of the doctor plain. We grow enthusiastic in contemplating the possibilities of the antitoxins, and we take off our hats to the great army of investigators who, despite the opposition of well meaning philanthropists, "will persist in destroying a few dogs and guinea pigs in order that they may teach us how to save babies," by throttling infection the instant it invades the human sanctuary; but still, after all, prevention is a still higher aim, and it is the chief glory of our profession that its best minds and purest hearts are ceaselessly active in this direction.

#### ADDRESS.

*Before the Graduating Class of the Wisconsin College of Physicians and Surgeons, April 16, 1895.*

BY U. O. B. WINGATE, M.D.

PROFESSOR OF DISEASES OF THE NERVOUS SYSTEM AND HYGIENE.  
MILWAUKEE.

It has sometimes seemed to me that an address on occasions like this, smacked somewhat like a dish of dessert at the end of a banquet, when every one had partaken of more than enough.

I am sure that the students in the college have had their fill; I can not conceive that the Faculty are hungry for any words from one of their number; and I have grave doubts about any of the friends present being in possession of a keen relish for anything oratorical at this time. However, we seem to be victims of custom's decree, but I promise not to weary you long.

The Wisconsin College of Physicians and Surgeons has completed the second year's work of its existence, a work that speaks for itself and needs no encomiums from me. It prides itself on having earnest, faithful and conscientious teachers, students in liberal numbers, zealous in the prosecution of their studies, and it congratulates itself on taking a position in the front ranks among the younger members of American Medical Colleges. It is the purpose of its Board of Directors and Faculty to maintain the stand it has taken, to advance from year to year, and to convince the public, and the medical world as well, by its works alone. It proposes to stand on its own foundation which has been carefully constructed, and it has no fears about its firm and lasting superstructure.